Required Elements of a Fish Health Management Plan for Public and Commercial Fish Culture Facilities in British Columbia

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I. Introduction

Managing the health of fish at a culture facility requires a program to determine health status and a system of recording mortality and disease. This allows operators to monitor trends and detect changes in disease status of fish that, in turn, enable early intervention to minimize health impacts.

A cornerstone of fish health management is the reduction or elimination of risk factors that could make fish more susceptible to disease. By identifying these risk factors, operators can take action before negative health effects occur. Factors include handling, feeding, anesthesia, predator interactions, water quality management, vaccination, and broodstock management.

Spread of disease causing agents and disease impacts can be minimized within and between groups of fish by managing disease outbreaks, careful handling of dead fish, good hygiene and disinfection practices, and limiting fish movements.

Drugs and chemicals used for disease control must be properly administered and monitored to protect the public, environment and fish. This requires adequate diagnostic support, and safe storage, use and handling.

To ensure that fish culture facility operators are employing good fish health practices, a written, up-to-date Fish Health Management Plan is required that outlines the actions or procedures that operators must use at a facility to meet fish health requirements.

This document describes what fish health requirements operators must include in their Fish Health Management Plan.

II. Goals of a Fish Health Management Plan

A Fish Health Management Plan aims to:

1. prevent the introduction of exotic diseases or disease causing agents;
2. reduce the occurrence of disease in fish held in the culture facility;
3. minimize the spread of disease to stocks within and outside the facility;
4. maintain an environment that promotes the health and productivity of cultured fish and reduces the susceptibility of fish to disease;
5. protect public health and minimize disease risks to cultured and wild fish through judicious use of drugs and chemicals; and
6. provide culturists and regulators with appropriate information from which rational, evidence-based fish health management decisions can be made.

III. Definitions

The definitions provided below reflect how these terms are used in this document.

Cultured fish:
Fish that have spent part or all of their life cycle within a fish culture facility.

Disease:
Disease includes a reportable disease or any other disease that may affect an animal or be transmitted by an animal to a person and the causative agent of that disease. (Canadian Food Inspection Agency, *Health of Animals* Act)

Disease screening:
Testing for evidence of early signs of disease or factors that could predispose a fish or population to disease.

Disinfection:
Actions undertaken to destroy infectious and parasitic disease-causing agents.

Drug:
A drug includes any substance or mixture of substances manufactured, sold or represented for use in (a) the diagnosis, treatment, mitigation or prevention of a disease, disorder or abnormal physical state, or its symptoms, in human beings or animals; (b) restoring, correcting or modifying organic functions in human beings or animals; or (c) disinfection in premises where food is prepared or kept (Health Canada, *Food and Drugs* Act).

Epidemiologically-linked:
Epidemiological links result when groups of animals share risk factors for the disease of concern.

Fish Culture Facility:
A fish culture facility is defined for the purpose of these guidelines as a location or facility that alters the normal movements, feeding and ecology of fish in order to affect their productivity in terms of reproductive success, growth or marketable fish products for commercial and/or stock enhancement purposes. In addition, a fish culture facility holds fish for a period of time.

Fish Health (Management) Staff:
The team of personnel, including the veterinarian, responsible for the health and welfare of fish at fish culture facilities. Fish Health Management Staff are responsible for identifying, managing and minimizing the impact of fish health risk factors; making major fish health decisions; and regular day-to-day fish health monitoring and management at the facility.

Fish Health Management Plan:
A written document that outlines the actions or procedures that a facility will use to meet the goals and requirements described in this document.

Holding Unit:
The basic, physical structures containing fish. These include netpens, tanks, troughs, spawning channels, brood lakes and incubation units.

Operator:
The company or agency who holds an aquaculture licence and is responsible for the operation of a fish culture facility in British Columbia.

Outbreak:
An unexpected occurrence of mortality or disease. This can mean (1) a disease occurring outside of the typical geographic or host range, (2) a previously unrecognized problem, or (3) a disease occurring at a rate higher than expected.

Qualified Fish Health Professional:
A term used to describe those persons with adequate post-secondary training and experience in the recognition of diseases in fish to qualify them for certification by a recognized body. Current legislation only recognizes a veterinarian as being qualified to diagnose and prescribe treatment of fish diseases. Veterinarians therefore serve as qualified fish health professionals.

Treatment:
Management actions, drugs, chemicals or biological agents given or applied to fish, to prevent or mitigate the impacts of disease on a fish or group of fish.

Vaccine:
A preparation or adjuvanted preparation of killed microorganisms; living attenuated, fully virulent, or related nonvirulent microorganisms; or parts of micro- or macroorganisms that are administered to produce or increase immunity to a particular disease (Health Canada, *Food and Drugs* Act).

IV. Required Elements of a Fish Health Management Plan

A. Characterizing the Health Status of Fish at a Culture Facility

1. Fish Health Records

Facilities must have an information management system that provides culturists with timely information to identify and assess changes in fish health to allow them to make fish health management decisions.

For individual groups of fish in the facility, operators must:
a) keep up-to-date fish health records including:
- disease history and management;
- pattern of morbidity and mortality, sampling and diagnosis of disease;
- actions taken to prevent, control, and treat disease;
- records of movements of fish within the facility; and
- health risk factors specific to the site and/or the affected fish group;

b) keep records, for a minimum, the entire time that the fish are being cultured (i.e. until they have been released to the wild or harvested); and
c) be able to link fish health records to other production records (i.e. feed, environment, transfers).

2. Monitoring Disease and Infection

Operators must have a plan for routine assessment of fish to determine their disease status and an action plan to prevent the spread of disease that will minimize the impact on fish and other organisms.

Operators must:
a) regularly and systematically inspect fish and fish holding units for signs of disease;
b) increase monitoring efforts for groups of fish showing unusual mortality rates, signs of morbidity, or subjected to stressful events that could predispose them to disease;
c) routinely evaluate fish health and other production records; and
d) develop an action plan to prevent, control or treat disease.

B. Identifying and Managing Risks to Fish Health

Risk factors must be identified and managed to minimise their effect on fish health and their role in predisposing fish to disease.

1. Water Quality

Maintaining good water quality is vital to good fish health.

Operators must have a:
a) regular program for monitoring and recording water quality (i.e. temperature, oxygen, effluent); and
b) contingency plan to restore water quality.

2. Factors that Predispose Fish to Disease

Certain activities can have a negative impact on fish, the effectiveness of their immune system and their ability to combat infections and disease.

Operators will:
a) minimize the time fish are exposed to stressful events such as anaesthesia/sedation, crowding, and out-of-water events (i.e. handling, counting, grading, tagging, injecting);
b) minimize predator interactions;
c) provide fish with suitable rearing conditions and appropriate nutrition; and
d) ensure equipment and methods used to handle fish will not result in significant injury or predispose fish to disease.

3. Vaccination

Vaccination is not a substitute for other aspects of fish health management, but part of an integrated disease prevention program.

Operators must use:
a) vaccination procedures that minimize injury, secondary disease or losses to fish; and
b) vaccination programs based on local disease/infection conditions and information on the safety and efficacy of vaccines.

4. Broodstock Health Management

Broodstock should be reared in a manner that recognizes and manages disease risks specific to this life stage and their progeny.

Operators must:
a) use a system to identify individual or select groups of brood fish and their

respective gametes from other production fish;
b) address the hygienic, nutritional and handling concerns unique to broodstock; and
c) use protocols for hygienic handling of broodstock or their gametes to prevent the transmission of disease causing agents to other fish.

C. Reducing Exposure to, or Spread of, Disease Causing Agents

Minimizing the exposure of fish to disease causing agents will reduce the spread of pathogens and disease.

1. Outbreak Investigation and Management

Detecting and managing outbreaks will help reduce the spread of disease or disease causing agents.

Operators must:
a) have access to the resources and qualified personnel needed to detect and manage a disease outbreak;
b) develop a rapid response plan to reduce the spread of disease and initiate it when a disease outbreak is detected;
c) detail all monitoring activities during and after an outbreak to establish the distribution of the disease and monitor the effectiveness of control and treatment measures;
d) keep details of investigations and verification of all outbreaks (this must be under the supervision of a qualified fish health professional); and
e) notify Provincial and Federal authorities in the event of outbreaks in accordance with existing regulations or surveillance agreements.

2. Management of Dead Fish

Operators must:
a) regularly remove dead fish from holding units and dispose of the fish in a manner that will not facilitate the spread of disease; and
b) plan for the removal and disposal of increased levels/numbers of mortalities during unexpected disease outbreaks or loss of fish.

3. Bio-security

Maintaining a clean, safe work environment reduces the potential for spread and exposure of fish to infectious or parasitic disease causing agents.

Operators must:
a) reduce the potential movement of infectious or parasitic agents within and between facilities by:
- using good hygiene and sanitation protocols that manage the movement

and disinfection of staff, contractors, visitors, vessels or vehicles; and
- routinely cleaning and disinfecting equipment and holding units;

b) safely handle and dispose of disinfectants (In accordance with occupational safety waste management and pollution regulations).

4. Release or Escape of Fish from a Culture Facility

Operators must:

a) minimize the risk of escape or release of sick or infectious fish from fish culture facilities; and

b) consider disease and treatment status when planning deliberate release or relocation of fish stocks where escapes can occur.

5. Movement of fish

Fish Health status must be considered when evaluating the risks of moving fish stocks.

Operators must:

a) ensure all equipment used to transport fish:
- safeguards the health of the fish being moved;
- minimizes the risk factors that may predispose the fish to disease;
- minimizes transfer of disease causing agents; and
- reduces the risk of accidental loss of fish and gametes during transport activities;

b) assess and mitigate the disease risks from cultured fish that are known to be, or are suspected to have, a disease or infection before they are sold, or given away;

c) assess and mitigate the risks associated with intentional release of fish to the wild;

d) minimize the transfer of disease agents between stocks within and in the vicinity of the facility; and

e) ensure optimal water quality during transport events.

D. Use of Drugs and Chemicals in Fish Health Management

1. Diagnostic Support

Operators must have a veterinary-client relationship with a licensed veterinarian to ensure:

a) reliable diagnoses are obtained; and

b) prescriptions for treatments can be obtained in an effective manner.

2. Drug, Chemical and Biological Use for Disease Treatment and Prevention

Operators must:

a) ensure staff have access to information on the drugs, chemicals and biologics that are used on site;
b) ensure safe handling and storage of drugs and chemicals;
c) keep records of the amounts of drugs, chemicals, biologics and medicated feeds purchased or moved into a fish culture facility and/or used during treatment;
d) ensure groups of fish that are treated can be identified during treatment and subsequent withdrawal times; and
e) keep records of treatment for the entire time that the fish are being cultured or until they have be released or harvested.

APPENDIX 1: Regulations/Policies Directly Related to Fish Health Management

A. Federal

1. Fisheries Act, RSC 1985, F-14.
   - Fishery (General) Regulations, SOR/93-53.
   - Fish Health Protection Regulations, CRC.
   - Regulations Amending the Fish Health Protection Regulations, SOR/97-392.

2. Feeds Act, R.S.C, c. F-7, s.1.
   - Feeds Regulations, 1983 SOR/83-593.

3. Pest Control Act, RSC, 1985.
   - Pest Control Regulations.

4. Health of Animals Act 1990, c21

5. Food and Drugs Act, Revised Statutes 1985 Chapter F27
   - Amended December 2000

B. Provincial

1. Aquaculture Regulation, B.C. Reg. 364/89.
   - Escape Amendments, B.C. Reg.335/00.

2. B.C. Veterinary Medical Association, By-Laws and Code of Ethics, 1999.

3. Fish Protection Act, SBC 1997.

4. Pesticide Control Act, RSBC 1996.
   - Pesticide Control Act Regulation, B.C. Reg. 319/81.

5. Pharmacists, Pharmacy Operations, and Drug Scheduling Act, RSBC 1996.
Veterinary Drug and Medicated Feed Regulation, B.C. Reg. 47/82.

6. Veterinarians Act, RSBC ch.476, 1996.

7. Veterinary Laboratory Act, RSBC ch.477, 1996

8. Waste Management Act, RSBC 1996.
   - Aquaculture Waste Control Regulation, B.C. Reg. 470/88.
   - Land-based Fin Fish Waste Control Regulation, B.C. Reg. 68/94.